ASK THE AUDIENCE: A SIMPLE TEACHING METHOD TO IMPROVE THE LEARNING EXPERIENCE IN LARGE LECTURES.

Ruth Pickford
Leeds Metropolitan University
Leeds, LS1 3HE
r.pickford@lmu.ac.uk

Heather Clothier
Sheffield Hallam University
Sheffield, S1 1WB
h.clothier@shu.ac.uk

ABSTRACT

The popularity of computer science H.E. courses has resulted in the challenge of delivering lectures to large cohorts of computing undergraduates. In some cases there has been limited success in student engagement. There is little scope for interaction and feedback may be inhibited.

It is generally accepted that where students actively engage with feedback, this may promote learning. This paper explains a technique, Colourcard, that is being used successfully in two U.K. universities to support the strategic goal to use feedback as part of teaching to promote learning. The basis of the technique is that lecturers use student feedback to control the pace and direction of the lecture, and to support the development of a relationship between lecturer and students.

Findings from two case studies are briefly presented. The cases involve delivery of first year undergraduate systems analysis and data modelling lectures to large student groups in 2002/03.

Keywords

Colourcard, Feedback, Large-Group Lectures.

1. INTRODUCTION

Widening participation in H.E. has resulted in larger cohorts on many undergraduate courses. Large cohorts have, in some cases, led to staff being overwhelmed by volume of marking and neglect of educationally desirable assessment and feedback [10]. This potential for neglect is particularly problematic, as assessment is the major influence on what, how, and indeed if, students learn.

This paper explains one possible approach to supporting undergraduate learning through strategic use of assessment and large group teaching.

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2. THE ROLE OF ASSESSMENT AND FEEDBACK IN UNDERGRADUATE LEARNING

"When assessment is at its best, it can be motivating and productive for students, helping them know how well they are doing and what else they need to do" [4].

The direct relationship and inseparability of assessment, feedback and learning is highlighted in the QAA principle "Institutions should ensure that appropriate feedback is provided to students on assessed work in a way that promotes learning and facilitates improvement" [13]. In order for feedback to promote learning, students must actively engage with the feedback [12,15 and 17] and the engineering of feedback to engage students in learning (assessment *for* learning, as separate from assessment *of* learning [8]) should be included in module design. Speed of feedback is commonly accepted to be important [17], and Gibbs [9] argues that the frequency and timing of feedback is of more importance than its quality. However, with large cohorts and the associated marking burden it is common for feedback to be slow.

In considering how to overcome this burden, one can turn to evidence that regular use of assessment in the classroom results in improved learning and that "assessment used as part of teaching has the most significant impact" [8]. If assessment and feedback can be integrated into the teaching of large cohorts, without the burden of marking, this would have clear benefits for learners and lecturers alike.

Regular and integrated use of assessment as part of teaching also reduces the threat of assessment. It is particularly important, in terms of retention of students from non-traditional backgrounds, that the assessment system should be non-threatening, and to this end it has been suggested that assessment at the end of the first semester should be primarily formative. This fits well with research findings that most undergraduates on modular programmes are over assessed and that a small percentage of the total assessments undertaken would typically produce exactly the same degree classifications [9].

However, we should use our knowledge that students are becoming more strategic in their use of time and effort and more driven by summative assessment in the way we design our courses to achieve particular strategic goals [9, 15].

If our strategic goal is to use feedback as part of teaching to promote learning then it follows that we should relate the feedback, in some way, to module assessment. Only by doing this can we ensure that students will take advantage of the learning opportunity.

It would seem then, that whilst it is beneficial to retain (to use for educational benefit) a summative assessment element, feedback should be engineered as a regular, integrated and primarily formative part of teaching.

3. TEACHING TO SUPPORT UNDERGRADUATE LEARNING

As cohorts have grown and the opportunity for distance and computer based learning has increased, academics have considered alternatives to traditional methods of teaching. Simply lecturing is widely acknowledged to be ineffective as a main teaching strategy [1, 10]. The lack of effective feedback from the audience is a major defect of the lecture method and student attention may be a problem [2]. However, in addition to presenting a cost effective means of curriculum delivery, the lecture theatre offers a forum for cohort cohesion, large scale social interaction and the enthusing of students by a lecturer.

It is generally accepted that young people have a desire to interact [2] and that this desire for interaction may have a direct effect on student engagement. It is also argued that deep approaches to learning demand the exercise of interpersonal skills between lecturers and students [1].

Given the potential benefits, it is pertinent to retain the lecture theatre as a resource and to attempt to address the shortcomings of the traditional lecture method for teaching large groups. The literature suggests that this is far from simple. Although there is a lack of research into effective ways of managing the learning of individuals within large groups [1], it is known that students tend to be passive in large groups and that there are difficulties in making large group lectures interactive [10]. Indeed, Gibbs & Jenkins [10] argue “in a very large class it is… perhaps impossible to stimulate the degree of interaction…required to ensure active learning”. The particular difficulties associated with larger lecture classes include difficulty knowing if students understand, eliciting student answers, and encouraging interaction between students.

Various techniques have been devised in an attempt to introduce feedback into lectures. These techniques have varied in their complexity from the limited show of hands method through to electronic lecture feedback systems, which are still relatively rare and as such are inaccessible to most lecturers. Bligh [2] reports that Harden et al [11], Taplin [16] and Dunn [7] all used visual feedback techniques based on coloured cubes or cards with some success. Any student feedback mechanism used in large lectures must as a minimum, be simple to use, simple to interpret, immediate, and used to control the lecture. The remainder of this paper describes how a simple feedback technique, Colourcard, is being used successfully to teach large cohorts of first year computing undergraduates in two institutions.

4. THE COLOURCARD FEEDBACK TECHNIQUE

The Colourcard feedback system requires each lecture to be structured around a series of milestone multiple-choice or true-false questions. The question is displayed at the front of the lecture theatre with colour coded options and each student holds up a card which corresponds to the colour of the selected option. The displayed options are colour coded in a consistent order and students' coloured cards are labelled in order to eliminate problems that colourblind students could otherwise experience. By using carefully designed questions, the lecturer is able to identify problems in student learning and to address these problems immediately before proceeding to the next milestone. The lecturer may use the feedback to control both the pace and direction of the lecture in line with student need.

It is considered that students are most likely to be motivated to engage in Colourcard if:

- their feedback immediately and directly influences the pace and direction of the lecture;
- questions are designed to be non-threatening in a guessing is good culture;
- there is a strong relationship between engagement in Colourcard and module assessment.

Thus, summative module assessment should include a multiple-choice test element without penalty for incorrect responses. This approach to assessment design may represent a paradigm shift. It is a manifestation of a strategic goal to use feedback as part of teaching to promote learning, and the strategic use of the knowledge that students are assessment driven to support this goal.

In the first of the two case studies summarised in this paper the entire module (teaching, student resources and assessment format) was designed primarily to support student engagement in the Colourcard technique. In the second case study Colourcard was incorporated into an existing module.

5. THE CASE STUDIES

5.1 Case Study 1

First year B.Sc. Computing and B.Sc. Business Computing, Leeds Metropolitan University. 2002/2003 delivery of a first semester module in systems analysis with 200 full-time students.

The Colourcard technique had been successfully piloted in the 2001/2002 delivery of a previous systems analysis module. The module was radically redesigned to fully support student engagement in Colourcard. All module *teaching* was via large group lectures (in tutorials tutors adopted roles of advisors, supporting student-centred study teams). Of the 20 lectures, 17 were designed around students using Colourcard to answer a set of 4-part multiple choice milestone questions. The technique was used to assess student understanding and reasoning, to develop skills, encourage interaction, as a basis for debate and to ascertain student satisfaction. Covers of 2 module resource booklets acted as the coloured cards. Of attenders, 90% consistently engaged in the use of Colourcard and attendance at lectures was good. A standard (on- line) anonymous module evaluation survey was completed by 132 students and of these 98% agreed or strongly agreed with the statement 'The delivery of formal teaching (lectures) has been good'.

Qualitative comments were supportive of the Colourcard technique. There were no negative comments expressed relating to Colourcard. The following are representative comments in the section "The things I liked about this module were…":

"Definitely the lectures. Other students in my group and I talk about these, we have an air of looking forward to a SA (systems analysis) lecture. The coloured cards help people stay awake, and is a good way for both students to see their own progress, and for lecturers to see their students'."

"Lectures were more interesting than in other modules, excellent idea to have students participating in quizzes and having them holding up coloured module guides which also forces them to bring them in each lecture"

5.2 Case Study 2

First year HND Computing, Sheffield Hallam University. 2002/2003 delivery of a first semester module in Business Process Analysis (systems analysis and entity modelling), and a second semester module in Business Information Solutions (systems design and database implementation). 137 full-time students.

In the first semester, Colourcard was initially restricted to two option answers (red and green cards), the summative unit phase test being true/false. Sometimes, students used Colourcard spontaneously in the lecture, toggling between red and green, without lecturer direction to do so, to indicate when they had grasped a concept. This was a particularly powerful form of feedback as the lecturer could gauge which explanation or analogy was the most effective. In the second semester Colourcard was extended to 4-part multiple-choice questions. Module booklets again formed the coloured cards. Students were asked to complete an anonymous questionnaire to indicate their opinions of the use of Colourcard on the modules. Of the 99 respondents 93% were supportive of the technique. Typical reasons given for liking Colourcard were:

"Some people are afraid to speak out in lectures so it allows them to get their views across."

"Got the whole class involved in answering and thinking about questions."

"It was fun."

"Allows the lecturers to get feedback on what information we understand and what we don't"

"Gave people a chance to test their own knowledge and see how well they are doing.

"I'd like all the modules to use the system."

6. CRITICISMS OF COLOURCARD AND LESSONS LEARNED

Of the 6 students (7%) in case study 2 who had reservations about the Colourcard technique one said that they "felt like a three year old when doing it", and another that it was a "waste of time" and "pointless". It may be that the Colourcard technique does not suit all learning styles, or it may be a reaction to some of the questions being seen as trivial. It was observed that if students considered a question trivial, their participation in Colourcard became inhibited. Students were less likely to hold up a coloured card not only for the trivial question but for subsequent non-trivial questions in the same lecture. Questions must be carefully designed if students are not to be demotivated.

One student commented that they didn't like Colourcard "because people didn't contribute". Strongest commitment to the technique was shown when it was used every week. It was found that if the technique was not used for a week students were more likely to forget to bring their coloured cards (booklets), and were less inclined to engage in Colourcard in the following session. It was as if it had been devalued because the lecturer had chosen not to use it.

Three students suggested that lecturer to student feedback could be improved. It is important that students see Colourcard to be of benefit to them. The benefit to the student is not simply that the correct answer is indicated, but that each option proffered is addressed by the lecturer. In some cases students will benefit from knowing the

proportion of the cohort selecting each option, in order that they are aware of the standard, and can appreciate how wide the gap is between their understanding and the norm. The lecturer may then use different explanations of concepts to help students close the gap between their understanding and the correct answer. Additional questions may be required and ultimately students may need to be directed to sources outside the lecture.

Further investigation is necessary to elicit more detail about the student reservations expressed and follow-up interviews are planned.

7. CONCLUSIONS

The Colourcard technique integrates frequent, formative assessment, without the burden of marking, into the lecture. As such, it combines the strengths and advantages of the traditional lecture with those of emerging student-centred (and mainly computer-based) tutorials. Another benefit is that the high level of lecturer-student interaction supported by the technique can lead to deep approaches to learning. The technique is well suited to large group lectures, and therefore may be of particular relevance to first year undergraduate teaching. Students perceive it to be of benefit and this is necessary if students are to engage with the technique. The greater benefit, however, is to the lecturer. The ability, at any point, in any lecture of any size to monitor student learning and pinpoint areas of confusion, empowers the lecturer to react immediately to student need.

The Colourcard technique may be integrated into any existing lecture at little cost. However, to fully realise the benefits, Colourcard should be regarded not as a technique but as a system of learning, with implications for both teaching and assessment design.

8. REFERENCES

[1] Bennett. C., Foreman-Peck L., Higgins, C. *Researching into Teaching Methods in Colleges and Universities*. London Kogan Page. (1996)

[2] Bligh. D., *What's the Use of Lectures?* Intellect. (1998).

[3] Brown. G., Bull. J., Pendlbury. M., *Assessing Student Learning in Higher Education.* London Routledge (1997).

[4] Brown. S., Institutional Strategies for Assessment in Brown. S., and Glasner. A., (eds) *Assessment Matters in Higher Education: Choosing and Using Diverse Approaches.* SRHE & Open University Press (1999).

[5] Brown. S and Race. P., *Lecturing A Practical Guide*. London Kogan Page (2002).

[6] Carbone. E., *Teaching Large Classes: Tools and Strategies.* SAGE Publications. (1998).

[7] Dunn, W.R., Programmed learning news, feedback devices in university lectures, *New University*, **3** (4) 21-22 15, 161(1969)

[8] Elwood. J., Klenowski. V., Creating Communities of Shared Practice: the challenges of assessment use in learning and teaching. *Assessment & Evaluation in Higher Education*. **27** (3) 243–256. (2002).

[9] Gibbs. G., Using Assessment Strategically to Change the Way Students Learn in Brown. S. and Glasner. A. (eds). *Assessment Matters in Higher Education: Choosing and Using Diverse Approaches*. SRHE & Open University Press. (1999).

[10] Gibbs. G. and Jenkins. A., *Teaching Large Classes in Higher Education: How to Maintain Quality with Reduced Resources*. London Kogan Page. (1992)

[11] Harden R. McG., Wayne, Sir E., and Donald, G., An audio-visual technique for medical teaching, *Journal of Medical and Biological Illustration,* 18 (1) 29-32. 161 (1968).

[12] MacLellan. E., Assessment for Learning: the differing perceptions of tutors and students. *Assessment & Evaluation in Higher Education*, 26 (4) 307-318 (2001).

[13] Quality Assurance Agency, *Code of Practice: Assessment of Students General Principles – Quality and Standards in H.E.* (2001). from: www.qaa.ac.uk/public/cop/copaosfinal/genprin.htm. Accessed April 2003

[14] Race. P., Why Assess Innovatively? in Brown. S. and Glasner. A., (eds.) *Assessment Matters in Higher Education: Choosing and Using Diverse Approaches*. SRHE & Open University Press (1999).

[15] Rust. C., The Impact of Assessment on Student Learning, *Active Learning in Higher Education.* **3**(2) 145-157 (2002).

[16] Taplin, G., The Cosford cube: a simplified form of student feedback, *Industrial Training International*, **4** (5) 218-219. 15, 161, 163, 198. (1969)

[17] Taras., M. Using Assessment for Learning and Learning from Assessment, *Assessment & Evaluation in Higher Education,* **27** (6) 501 –510 (2002).